

Syntax and Tone in Runyankore

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1 Introduction

The interaction between phonological phenomena and other "levels" of the grammar is well documented. In fact, it is taken as a given that phonological structure and morphological structure are related. However, in the past several years, the study of the interaction of syntax and phonology has burgeoned to include research in such disparate languages as Italian, Chinese, Japanese, and several Bantu languages. (Napoli & Nespors 1986, Kaisse 1985, Selkirk 1986, Odden 1990, 1997) In this discussion, we examine two different principles in the tonal phonology of Runyankore. Both occur at the phrasal level (i.e., they are only manifest in a phrasal context) and both appear in a limited range of syntactic environments. One principle is responsible for the deletion of a high tone, the other, for the insertion of a high tone. Ultimately, we shall see that their application is related to the syntactic and prosodic structure of the utterance. Before examining the relevant data from Runyankore, let us compare the two major theoretical approaches to the syntax-phonology interface.

2 Theories

Several studies have examined the relationship between various phonological processes in languages and the syntactic conditions under which these processes may occur. In particular these have been Napoli & Nespors (1979) for Italian *Raddoppiamento Sintattico*, Selkirk (1980) for French, Kaisse (1985) for various languages, Nespors & Vogel (1986) for Italian, Selkirk (1986) for Chimwiini vowel shortening; Odden (1987, 1996) for Kimatuumbi.

The various approaches to the syntax-phonology interface can be roughly divided into two approaches. One approach (that favored by Selkirk, Napoli & Nespors, and Nespors & Vogel) maps prosodic structures onto phonological structure and then uses those as the domain for the application of phonological rules. The second, the

"direct reference theory" (Kaisse 1985 and Odden 1990, 1997) allows phonological rules to make "direct reference" to the syntax. We examine aspects of these two theories below.

2.1 Direct Reference Theory

According to Kaisse (1985), various phenomena associated with the syntax-phonology interface can be explained by allowing direct reference to syntactic information by phonology. I will briefly review a few of the examples that Kaisse cites in her 1985 discussion. The first of these will be the familiar case of "syntactic doubling" from Italian (discussed at length in Napoli & Nespor 1979 and Nespor & Vogel 1986)

2.1.1 Italian Raddoppiamento Sintattico

Several dialects of Italian possess a phonological process referred to as *Raddoppiamento Sintattico* (RS) ('syntactic doubling'). RS involves the gemination of the initial consonant of a word, *b*, when it stands in a particular configuration to a preceding word, *a*.

- | | | | |
|-----|----|-------------------------------------|----------------------------------|
| (1) | a. | <i>Maria è più [c:]alda che mai</i> | AP |
| | | 'Maria is hotter than ever.' | |
| | b. | <i>Ho visto tre [c:]ani.</i> | NP |
| | | 'I saw three dogs.' | |
| | c. | <i>Mario ha [f:]attu tutto.</i> | VP |
| | | 'Mario did everything' | (= Napoli and Nespor 1979: [20]) |

In each of the sentences above, the initial consonant of a particular word is lengthened. Theories developed to account for this phenomenon have been introduced by Napoli & Nespor (1979), Nespor & Vogel (1986), and Kaisse (1985). All of these theories relate the appearance of RS to some aspect of the syntactic structure of the utterance, as opposed to a purely sociolinguistic or phonological account.¹

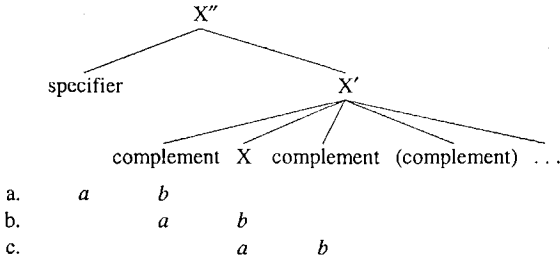
2.1.2 The Left-Branch Condition and c-command

Napoli & Nespor (1979) refer directly to syntactic structure in formalizing the relationship that must hold between two words in order to RS to take place. The Left-Branch condition describes this relationship. In basic terms, a word *a* must be on the

¹ Napoli & Nespor (1979) indicate that RS is common in many varieties of Italian. They limit themselves to the Sicilian and Tuscan varieties, which they claim have the same syntactic environment (p. 813).

left edge of the constituent that contains *b* in order for RS to apply to word *b*. Consider the phrase in (2).²

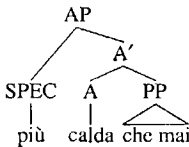
(2) Italian Maximal Projection



In this phrase, RS can only hold between the words in (2a) and (2b), where the word labeled (*a*) is on the left edge of the constituent that contains the word labeled (*b*). If there were no complement preceding the head of the phrase (*X*), then RS could occur in (2c). Specifiers always allow RS with a following word, as illustrated in (1).

The structure of the adjective phrase in (1a) is given in (3). Here, the word *più* 'more' is on the left branch of the constituent that contains the following word *calda* 'hot' and so, RS occurs.

(3) 'hotter than ever'



Kaisse reanalyzes the Left-Branch Condition in terms of the syntactic relationship c-command. The goal is to capture in a simpler fashion the relationship that exists between the two words in question.

(4) **c-command**

A c-commands B if the first branching node dominating A also dominates B.

More specifically, she interprets this in terms of X-bar syntactic theory.

² Space constraints do not permit a full description of the Left-Branch Condition. Readers are referred to Napoli & Nespor 1979 and Kaisse 1985.

- (5) **Domain c-command:** In the Structure [$X_{Max} \dots \alpha \dots$], X^{Max} is defined as the domain of α . Then α c-commands any β in its domain.

Domain c-command gives special status to the following: heads and non-lexical items (things dominated by something other than an X'' , like determiners, auxiliaries, and complementizers).

Kaisse (1985) also examines some other familiar examples of external sandhi from French, Kimatumbi, Gilyak, and Ewe. In these examples, the c-command relationship holds between words in an external sandhi configuration.

2.2 Indirect Reference Theory

In this section, we examine a theory of the interaction between syntax and phonology that can be described as "indirect". In this model, the end-based model of Selkirk (1986), the information about syntactic structure is not directly available to phonological rules. Rather, syntactic structures are the basis for the creation of prosodic structure (see Selkirk 1986 for a discussion of the levels of prosodic structure). It is within a particular prosodic domain that a phonological rule will apply.

2.2.1 End-Based (Selkirk)

The Bantu language Chimwi:ni exhibits a vowel length alternation, exemplified in (6), from Kisseberth & Abasheikh (1974).

(6) Chimwi:ni Vowel Shortening

ku-wa:fiq-a	'to agree, to approve'	ku-wafiq-an-a	'to agree with one another'
xa:tjima	'the end'	xa:tjima-ye	'its end'
x-so:m-a	'to read'	x-som-esh-añ-a	'to teach'
jo:hari	'jewel'	johari-ye	'her jewel'
ku-re:b-a	'to stop'	ku-eb-et-an-a	'to stop for one another'
ku-tet:ez-a	'to loosen something'	ku-tet-ek-a	'to be able to be loosened'

The general principle illustrated by the data in (6) shortens a long vowel in pre-antepenultimate position (PAS, pre-antepenultimate shortening in Kisseberth & Abasheikh). As the data in (7) illustrate, PAS also applied in the phrasal context as well: a long vowel in pre-antepenultimate position must surface as short.

(7) Chimwi:ni Phrasal Vowel Shortening

shika:ni	'(pl.) seize!'	shikani munt'u uyu	'(pl.) seize this man!'
soma:ni	'(pl.) read!'	somani chuwo ichi	'(pl.) read this book!'
peteka:ni	'(pl.) send!'	petekani xati izi	'(pl.) send these letters!'
mu:nt'u	'person'	munt'u uyu	'this person'

iko:pa	'glass'	ikopa iyi	'this glass'
ma:yi	'water'	mayi malada	'fresh water'
chi:nt ^h u	'thing'	chint ^h u shpiya	'something new'
xfu:nguṭa	'to open'	xfunguṭa xalbi	'to open one's heart'
xsu:la	'to want'	xsula uki	'to want honey'

In her analysis of Chimwi:ni, Selkirk (1986) offers that PAS follows from an analysis of the Chimwi:ni sentences prosodically. A stress rule (similar to a rule found in Latin) applies stress only to the antepenultimate or the penult syllable. Only stressed syllables can be long. The rule of PAS shortens a long vowel found in pre-antepenultimate position.

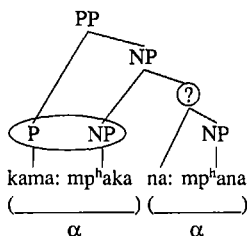
(8) Stressless Shortening (SS)

$$[-'(\text{main stress})'] \rightarrow V$$

Since only antepenult or penult vowels in the phrase receive stress, they are immune from stressless shortening. Any other long vowel is therefore shortened. The key issue then becomes the question of identifying the phrasal domain to which these rules apply. There is some range of syllables to which the rule assigning stress refers. A successful theory will predict which syllables are assigned stress and therefore made immune to the rule of Stressless Shortening.

According to Selkirk, the relevant fact here is the role played by domain ends. In two of the examples that she analyzes, Selkirk observes that there is no one syntactic constituent that predicts the domain for stress, α .

(9) Selkirk (16): 'like a cat and a rat'



According to Selkirk, there is no consistent theory that describes the domain α in (9).

Selkirk's solution to this problem is to propose that the derived domain is a constituent of the **phonological** representation of prosodic constituents. The relation between syntactic structure and prosodic structure is defined by reference to the ends of syntactic constituents. The type of syntactic constituent, whether XMax or Word, is a language-specific parameter.

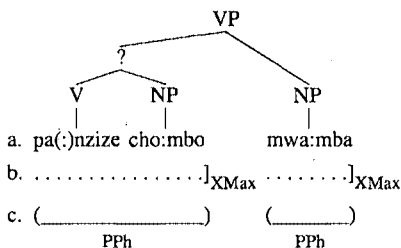
The prosodic constituents that are relevant for the computation of phonological rules are created based on the syntax following the end parameters setting.

(10) End Parameter Settings (Selkirk (23))

- i. $\left. \begin{array}{l} \text{Word} \\ \text{X}_{\text{max}} \end{array} \right\}$ $\text{Word} \left[\begin{array}{l} \text{X}_{\text{max}} \end{array} \right]$
 ii. $\left. \begin{array}{l} \text{Word} \\ \text{X}_{\text{max}} \end{array} \right\}$ $\text{Word} \left[\begin{array}{l} \text{X}_{\text{max}} \end{array} \right]$

Thus, the mapping of the Chimwi:ni phrase *panzize cho:mbo mwa:mba* would be as follows.

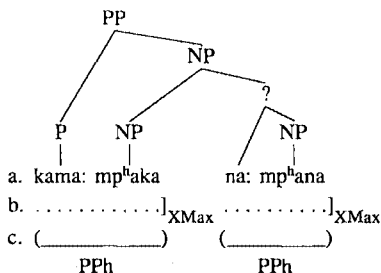
(11) Prosodic Domains Built from XMax



The end setting parameter identifies the right end of the maximal projections, as shown in line (b). Based on these edges, the phonological phrase (PPh) domains are created. The PPh domains are the domains of the application of the stress and stressless shortening rules described above.

Another important claim of the end-based theory is that it is able to pick out phonological domains that are not part of any single syntactic constituent. For example, consider Selkirk's analysis of (9b) given here as (12).

(12) Selkirk (27)



Notice that the first PPh constituent constructed on line c. of (12) encompasses the preposition and the following NP, although these are not a single constituent of syntactic structure. Thus, the end-based account is, according to Selkirk, better able to handle these facts.

The direct and indirect reference theories both refer specifically to certain elements to syntactic structure. However, the major difference between them is whether syntactic structure information is accessible to phonological rules. The direct-reference model, by allowing rule to "know" things about syntactic structure, allows for a tighter relationship between syntactic structure and phonology. Syntactic relationships may also hold between elements of a phrase that are not directly adjacent as long as the correct relationship holds between them. We shall see below that there is just such a case in Runyankore. On the other hand, the indirect-reference theory allows for the possibility that syntactic relationships may not be as crucial as the edges of syntactic units. Because of syntactic structure, this model predicts that such prosodic constituents as the phonological phrase may cut across syntactic constituents or break up strings that are related in the syntax. With respect to tone insertion, we shall see that this is true in Runyankore.

3 General Facts in Runyankore

There are two basic tone-syntax interactions: high tone insertion (HINS) and high tone deletion (HDEL). Both are conditioned by factors external to the word, i.e., syntactic or prosodic (depending upon the rule). While these two processes are very basic, they have complicated domains of application. The following sections will describe the occurrence of both HINS and HDEL. First, in sections Tone Deletion-2, we provide a very basic overview of HDEL and HINS. In section Exceptions to HDEL and Extensions of HINS, we will consider larger phrases and the apparent exceptions to HDEL. These sections will also allow us to demonstrate that HINS occurs in a wider range of environments and to a wider range of lexical categories.

3.1 Tone Deletion

Let us begin with the more restricted of the two processes under consideration, high tone deletion, HDEL. HDEL causes the deletion of a high tone from the head noun just in case the following word is high toned and stands in a particular relationship with the head. Specifically, a high toned noun followed by a high toned adjective or possessive pronoun (a plural), then the high tone of the noun stem disappears on the surface (high tone sponsors, i.e., underlyingly high toned, vowels are underlined).

As the phrases in (13)–(14) show, the high tone of the noun stem does not surface when a following high-toned adjective or possessive follows; it is deleted.³

- | | | | | |
|------|----|------------------------|--------------------|-----------------------------|
| (13) | a. | omw-áana | | 'child' |
| | | CL1.child ⁴ | | |
| | | omwaaana waftu | | 'our child' |
| | | CL1.child CL1.our | | |
| | | omwaaana waáftu | | 'your _p child' |
| | | omwaaana waábo | | 'their child' |
| | b. | enkóko | | 'chicken' |
| | | enkoko yaftu | | 'our chicken' |
| | | enkoko yaáftu | | 'your _p chicken' |
| | | enkoko yaábo | | 'their chicken' |
| | c. | omukamá ... | omukamá waftu | 'our chief' |
| | | embúzi | embuzi yaftu | 'our goat' |
| | | embwá ... | embwa yaftu | 'our dog' |
| | | obwóoci | obwqoci bwaftu | 'our honey' |
| (14) | | eriinó ... | eriinó ruháango | 'large tooth' |
| | | ebitóosha | ebitqosha biháango | 'large mushrooms' |
| | | emótoka | emqtokaa mpáango | 'large automobile' |
| | | embwá ... | embwaa nkúru | 'old dog' |

The following phrases illustrate an important point about HDEL. Observe first that the high tone of the head noun 'child' is not deleted before a toneless adjective, *murunji* 'good'. But, when there is a high-toned element in the constituent that follows the head noun, the high tone of the head does delete.

- | | | |
|------|----------------------------|----------------------|
| (15) | omwáana murunji | 'a good child' |
| | omwaaana murunji munóonga | 'a very good child' |
| | omuhijnji murunji munóonga | 'a very good farmer' |
| | embwaa nuunji munóonga | 'a very good dog' |

The phrases in (15) show that HDEL actually must look at the following phrase. The range of phrasal elements that can appear with an adjective or a possessive preposition as the head is extremely limited. Only the word *munóonga* 'very' can

³ I will underscore a tone-bearing unit that has lost a high tone and will boldface (**á**) a tone bearing unit that has received a high tone by insertion. A vowel marked like [**á**] indicates an underlying high tone still present on the surface.

⁴ Note the following abbreviations: CL1: class 1 prefix (etc.); 1s: first person singular (etc.); NEG: negative; REM: remote; PST: past tense; FV: final vowel morpheme. The symbols √ and [represent the left edge of the verb root and the verb stem, respectively.

follow an adjective within an AdjP. This structure is shown within the noun phrase in (16).

- (16) [[omwaana]_{N'} [muruunji munóonga]_{AdjP}]_{NP}
 child good very
 'a very good child'

With the examples in (15), we see the effect of the high tone within the adjective phrase. Later, we shall see that only the immediately following constituent is relevant for HDEL. This significant point to be garnered here is that the following *constituent* and not just the immediately following word is relevant for HDEL.

Of particular interest in these phrases is the fact that the high tone of the noun heading the NP is lost even if the immediately following word is toneless. The high tone on the word 'very' *munóonga* is sufficient to condition the deletion of the high tone on the preceding noun.

HDEL does not apply to the adjective heading the Adjective phrase modifying the noun. Consider the phrases in (17). HDEL does not delete a high tone on an adjective that is followed by a high toned modifier (viz. *munóonga* 'very').

- (17) enkaitoo nkúru munóonga 'very old shoes'
 enkókoo nkúru munóonga 'very old chickens'
 enkókoo ntó munóonga 'very young chickens'
 omuhijnji mukúru munóonga 'very old/important farmer'
 omwaana mukúru munóonga 'very old/important child'
 omwaana muháango munóonga 'very big child'

To summarize the basics, HDEL targets only a head noun before either an adjective or a possessive pronoun. Below, we will examine the syntactic structures where HDEL does not take place and contrast them to the ones where it does. In doing so, we will gain a clearer picture of the exact formulation of the process of HDEL. First, we discuss the principle that inserts a high tone onto a toneless head noun. This will allow us, in the end, to see that the two different principles, high deletion and high insertion, operate within different domains.

3.2 Tone Insertion

Compared to HDEL, the process that inserts a high tone is more widespread: it applies to more lexical categories and appears to have fewer restrictions on its application. High tone insertion (HINS) occurs when a toneless noun (stem) is followed by a toneless word in the same phrase. As we shall see below, HINS is subject to certain limitations that are particularly relevant for a theory of syntax-phonology interaction. However, for now, just consider some toneless nouns followed by a modifying toneless adjective, given in (18).

- | | | | |
|------|----|-------------------|---------------|
| (18) | a. | omuuntú muruunji | 'good person' |
| | | omuguhá miruunji | 'good rope' |
| | | eihurí riruunji | 'good egg' |
| | | enkaitó nuunji | 'good shoe' |
| | b. | omuguhá muraingwa | 'long rope' |
| | | omuhoró muraingwa | 'long panga' |
| | | omuguzí muraingwa | 'tall buyer' |

However, if the following adjective is high toned, HINS does not take place, as shown in (19).

- | | | | |
|------|--|----------------|------------------------|
| (19) | | omuuntu mugúfu | 'short person' |
| | | omuguha mugúfu | 'short rope' |
| | | amahwa magúfu | 'short thorns' |
| | | omurimi mukúru | 'old/important farmer' |
| | | omuuntu mukúru | 'old/important person' |
| | | omuguzi mukúru | 'old/important buyer' |

HINS also occurs before singular possessive pronouns, which are toneless. These are the singular forms: 'my', 'your_{sg}', and 'his/her'. Some examples are given in (20):

- | | | | |
|------|----|-----------------|---------------------------|
| (20) | a. | omuguzí waanje | 'my buyer' |
| | | omuguhá gwaanje | 'my rope' |
| | | eihurí ryaanje | 'my egg' |
| | b. | omuguhá gwaawe | 'your _{sg} rope' |
| | | enkaitó yaawe | 'your _{sg} shoe' |
| | | eihurí ryaawe | 'your _{sg} egg' |
| | c. | enkaitó ye | 'his/her shoe' |
| | | eihurí rye | 'his/her egg' |
| | | omurimí we | 'his/her farmer' |

As with high-toned adjectives, HINS fails if the following possessive is high toned, shown in (21).

- | | | | |
|------|----|-----------------|---------------------------|
| (21) | a. | omuguzi yaftu | 'our buyer' |
| | | omuguha gwaftu | 'our rope' |
| | | eihuri ryafu | 'our egg' |
| | b. | omuguha gwaáftu | 'your _{pl} rope' |
| | | enkaito yaáftu | 'your _{pl} shoe' |
| | | eihuri ryaáftu | 'your _{pl} egg' |

- | | | |
|------|------------------------|-------------------|
| c. | omuguha gwaábo | 'their rope' |
| | enkaito yaábo | 'their shoe' |
| | eihuri ryaábo | 'their egg' |
| (22) | e-báruha nuunji | 'good letter' |
| | CL9.letter CL9.good | |
| | e-mótoka nuunji | 'good automobile' |
| | eci-káaraanjiro caanji | 'my roasting pan' |

These examples illustrate the long-distance blocking of HINS by a high tone on the noun stem. The lexical high tone of the noun need not be on the final or penultimate syllable to block HINS. If this were the case, we might appeal to the Meeussen's rule (i.e., the OCP) to account for the blocking. But, in a form like *eci/káaraanjiro* 'roasting pan' the high tone is at least two tone-bearing units away from the target of HINS. Nevertheless, HINS still does not occur.

So far, HINS has appeared almost as a complement to HDEL. While the latter deletes a high tone before another high tone, the former inserts a high tone onto the head noun just in case there is not a following high-toned word. As we see below, HDEL and HINS turn out to have somewhat different domains of application.

Unlike tone deletion, tonal insertion *does* occur on verbs. The verb stem must be toneless and followed by a toneless word.

- | | | | |
|------|----|----------------------------|---------------------------------------|
| (23) | a. | n-aa[reeb-á buremu | 'I have just seen Buremu' |
| | | 1s.PST[√see-FV Buremu | |
| | | naa[teecerá buremu | 'I have just cooked for Buremu' |
| | b. | ti-n-áa[reeb-á buremu | 'I have not seen Buremu' |
| | | NEG-1s-PST[√see-FV | |
| | | tináa[teecerá buremu | 'I have not cooked for Buremu' |
| | c. | ba[bará buremu | 'they count Buremu' |
| | | 3P[count | |
| | | ba[reebá buremu | 'they see Buremu' |
| | d. | a-ka[reebá kagoma | 's/he saw the bataleur eagle' |
| | | 3s-REM[see | |
| | | aka[barirá buremu | 's/he will count for Buremu' |
| | | aka[gurá magaro na makáasi | 's/he will count pliers and scissors' |
| | e. | yááka[ramutsyá buremu | 's/he has just greeted Buremu' |
| | | yááka[ramutsya kakúru | 's/he has just greeted Kakuru' |

f. yááka[téécera buremu	's/he has just cooked for Buremu'
yááka[téécera kakúru	's/he has just cooked for Kakuru'
yááka[shééndecereza buremu	's/he has just escorted Buremu'
yááka[shééndecereza kakúru	's/he has just escorted Kakuru'

In particular, the examples in (23e–f) show that the target and the trigger must both be toneless. A high tone anywhere on the verb stem or on the trigger will block HINS.

In the following section, we will examine some syntactic domains where HDEL does not occur. At the same time, we will highlight the areas where HINS takes place that are broader than the targets already presented. The picture that emerges is one where HDEL and HINS target very similar locations (i.e., words) but where HINS has a relatively wider range of application than HDEL, which we shall see is restricted to nominal phrases.

3.3 Exceptions to HDEL and Extensions of HINS

Several different categories of following word do not fall within the domain of application of HDEL. From what we have seen, only nouns are targeted for high-tone deletion. In the following section, we consider cases where a noun is immune to HDEL. This will help define the range of the application of HDEL. At the same time, we consider the range of HINS to illustrate its wider and more general range of application. Numbers are particularly interesting because they fail to condition HDEL but *do* condition HINS. Furthermore, HINS will apply to any eligible lexical category: nouns, verbs, and prepositions.⁵ Below follow data for several of these categories. The first of these to be considered will be numbers.

3.3.1 Numbers and Phrasal Tone

Numbers in Runyankore (and in Bantu generally) have some interesting properties. First, there is a morphological difference between the numbers 1–5 and 6–9: their prefixes and tone are different.

⁵ Unfortunately, adjectives never appear in the correct location to allow HINS to target them.

(24)	emwe	'one'
	ibiri	'two'
	ishatu	'three'
	ina	'four'
	itaano	'five'
	mukáaga	'six'
	mushaanzhu	'seven'
	munáana	'eight'
	mweenda	'nine'
	ikúmi	'ten'

The numbers from six to nine do not have a high toned prefix. Because of this fact, they behave differently from the numbers one to five whose prefix is high toned (underlyingly). Consider the following.

(25)	a. abaantu bá-biri	'two people'
	abaantu bá-shatu	'three people'
	abaantu bá-na	'four people'
	abaantu bá-taano	'five people'
	b. enkók' í-biri	'two chickens'
	enkók' í-shatu	'three chickens'
	enkók' í-na	'four chickens'
	enkók' í-taano	'five chickens'
	c. ebiñeebwa bí-biri	'one peanut'
	ebiñeebwa bí-shatu	'three peanuts'
	ebiñeebwa bí-shatu	'four peanuts'
	ebiñeebwa bí-taano	'five peanuts'

The exception to HDEL appears when a high toned noun is followed by a high toned number. As shown in (26), where the high tone of the head noun persists despite the following high-toned word (the number).

(26)	abakáma mukáaga	'six chiefs'
	abakáma munáana	'eight chiefs'
	embwáá mukáaga	'six dogs'
	enkóko mukáaga	'six chickens'

Compare also the following minimal pairs in which we might expect the contrast to be neutralized by HDEL. In fact, the tonal contrast remains. The lexical high tone of the noun stem is retained in the examples in (27).

- (27) a. *enda mukáaga* 'six stomachs'
 endá mukáaga 'six lice'
 b. *enzhu mukáaga* 'six houses'
 enzhú mukáaga 'six gray hairs'

On the other hand, HINS does take place before toneless numbers. Because of this there is neutralization if the number is toneless, as in (28) and (29).

- (28) a. *endá mushaanzhu* 'seven lice'
 endá mushaanzhu 'seven stomachs'
 b. *endá mweenda* 'nine lice'
 endá mweenda 'nine stomachs'
- (29) a. *enzhú mushaanzhu* 'seven gray hairs'
 enzhú mushaanzhu 'seven houses'
 b. *enzhú mweenda* 'nine gray hairs'
 enzhú mweenda 'nine houses'

The underlined vowels in *endá* 'lice' and *enzhú* 'gray hair', indicate that noun stem is underlyingly high toned, as distinct from *enda* 'stomach' and *enzhu* 'house', which are underlyingly toneless. Because the numbers *mushaanzhu* 'seven' and *mweenda* 'nine' are toneless as well, a high tone appears on the head noun.

To summarize, a following number can create an environment for the application of HINS. However, a following number does not create an environment for HDEL. As we have seen, some numbers (*mukaaga* 'seven' and *mweenda* 'nine') lack high tones. This is evidence that the domain for HINS seems to be larger than the domain for HDEL. There are high-toned words, which we will examine later, that fail to condition HDEL. We assume that these words pattern with numbers. Unfortunately, none of the categories of words that fail to condition HDEL have any toneless members, apart from numbers.

In (30) we see the numbers twenty through one hundred. Before considering these words, recall that the numbers one through five have high-toned prefixes, which are just vowels in some cases. Because of this, the final vowel of *makúmi* 'ten(s)' undergoes glide formation. Forms for sixty, seventy, eighty, and ninety, which have been borrowed from Luganda, appear to be the more usual form now and will also appear below.

(30) Runyankore 20–100

	Runyankore	Luganda Borrowings
10	<i>ikúmi</i>	
20	<i>makúmy áábiri</i>	
30	<i>makúmy ááshatu</i>	
40	<i>makúmy áána</i>	
50	<i>makúmy áátaano</i>	

numbers 'seven' *mushaanzhu* and 'nine' *munáana*) the word 'hundred' is targeted for HINS, as in seven hundred and nine hundred.

(33) Runyankore Numbers 100–900

	Long Form	Short Form
100	cikúmi	
200	magan' áábiri	bíbirí
300	magan' ááshatu	bíshatu
400	magan' áana	bíina
500	magan' áátaano	bítaano
600	magana mukáaga	rukáaga
700	maganá mushaanzhu	rushaanzhu
800	magana munáana	runáana
900	maganá mweenda	rweenda

Unlike the hundreds numbers, the numbers in the thousands are the target for HDEL, shown in (34). This is because the word 'thousand' *orukúmi* is high toned. When the following word, the unit, is high toned, then the word 'thousand' loses its high tone. Recall that the number one through five have high-toned initial vowels. So, the only place where 'thousand' does not lose its high tone is when it stands by itself, or is followed by the numbers seven or nine.

(34)	orukúmi	'thousand'
	enkum' ífbiri	'two thousand'
	enkum' ífshatu	'three thousand'
	enkum' íina	'four thousand'
	enkum' íítano	'five thousand'
	enkumi mukáaga	'six thousand'
	enkúmi mushaanzhu	'seven thousand'
	enkumi munáana	'eight thousand'
	enkúmi mweenda	'nine thousand'

However, if the word 'and' *na* is part of the number, then the preceding number is insulated from HDEL.⁷

(35)	a. nkáaga n' éémwe	'sixty-one'
	nkáaga n' ífbiri	'sixty-two'
	nkáaga na mukáaga	'sixty-six'
	nkáaga ná mushaanzhu	'sixty-seven'

⁷ We will discuss the appearance of the high tone on *na* 'and' in greater detail below.

- | | |
|--------------------------|--------------------------|
| b. rukáága na mukáaga | 'six hundred and six' |
| rukáága ná mushaanzhu | 'six hundred and seven' |
| rukáága na ikúmi | 'six hundred and ten' |
| rukáága na mukumy áábiri | 'six hundred and twenty' |

There is a difference between a series of number word in a number phrase and the type of phrasal number given in (35). When the word *na* 'and' appears in the number, we there is a significant break that prevents the application of HDEL.

3.3.2 Quantifiers and HDEL

HDEL does not occur when the word following the head noun of the phrase is the universal quantifier "all". The examples in (36) illustrate this with phrases comprising a noun and a following universal quantifier.

- | | | |
|------|---------------|-----------------|
| (36) | abakáma bóona | 'all chiefs' |
| | aboozhó bóona | 'all boys' |
| | amaarwá góona | 'all beer' |
| | embwá zóona | 'all dogs' |
| | enzhú zóona | 'all gray hair' |
| | embuzí zóona | 'all goats' |

We also find the failure of HDEL before another type of quantifier: *-inji* 'many', shown in (37).⁸

- | | | |
|------|------------------|-----------------|
| (37) | amakáma baínji | 'many chiefs' |
| | enkóko fiínji | 'many chickens' |
| | endá fiínji | 'many lice' |
| | abahíínji baínji | 'many farmers' |

Two other quantifiers that do not conditioning HDEL on following words are given in (38).

- | | | |
|------|-----------------|-----------------|
| (38) | a. -ónka | 'only' |
| | omuhííji wéenka | 'only a farmer' |
| | ecikópo cóonka | 'only a cup' |
| | embwáá yóonka | 'only a dog' |
| | obúro bwóonka | 'only millet' |

⁸ The final high tone of *-inji* retracts in phrase-final position.

b. -ómbi	'both'
ahííñji bóombi	'both farmers'
emisyó yóombi	'both knives'
embáá zóombi	'both dogs'
ebikópo byóombi	'both cups'

Interestingly, the question of HINS does not really come up with these quantifiers because they are all high toned and thus block the appearance of an inserted high tone on a toneless noun phrase head. But, remember that some numbers are toneless and do condition HINS.

3.3.3 Determiners and Demonstratives

Like the quantifiers, a number of other high toned words also fail to condition HDEL. These words are also members of the class of words containing quantifiers, demonstratives, and determiners. The first example includes various types of demonstrative words, as shown in (39).

(39) a. abakáma báhi	'which chiefs'
aboozhó báhi	'which boys'
embwá zíha	'which dogs'
enzhú zíha	'which gray hairs'
b. omukám' óoha	'which chief'
enzhú zíha	'which gray hairs'
c. omukám' óogu	'this chief'
omukám' óogwe	'that chief'
omukám' ooríya	'that chief'
omukám' oogwo	'that chief (visible, close)'
d. abakám' áaba	'these chiefs'
abakám' áabwe	'those chiefs'
abakám' áabo	'these chiefs'
abakám' ábaríya	'those chiefs'
e. enkók' ééji	'this chicken'
kaankomáángw' ééji	'this woodpecker'

Like these words, we find that postposed phrasal modifiers of nouns (definite adjectives, relatives, possessives, etc.) also do not condition HDEL.

3.3.4 Definite Adjectives and Phrasal Modifiers

There is a distinction between an indefinite adjective and a definite adjective in many Bantu language. In Runyankore, the pre-prefix vowel is absent in indefinite adjectives. However, if the adjective is definite in meaning, an initial vowel is present. The

definite form of adjectives ("the good dog" versus "a/some good dog") is structurally similar to relatives and can be considered sentential in nature. One possible translation or paraphrase for these forms is "a dog that is good", showing their relationship with relative clauses.

First, let us consider some definite forms of the adjective. The following forms all include head nouns that are high toned in the input. Observe that they retain their high tone.

- | | | |
|------|------------------------|-----------------------|
| (40) | ecikóp' éé-cí-bi | 'the bad cup' |
| | emótok' éé-m-bi | 'the bad car' |
| | erín' éé-ri-háango | 'the large cup' |
| | ebitóósh' éé-bi-háango | 'the large mushrooms' |
| | omwáán' óó-mu-háango | 'the large child' |
| | ebáruh' éé-n-uunji | 'the good letter' |

The definite form of the adjectives differs from the indefinite in its possession of an initial or augment vowel. However, one thing to note from the data in (40) is that this vowel is high toned and that it absorbs the preceding vowel (which, unless high, disappears completely leaving only its mora). Because of this output configuration, it is impossible to tell definitively whether HINS had taken place—the target vowel for HINS will be high already.

Another phrasal complement to a head noun is the relative clause.

- | | | |
|------|-----------------------|-----------------------------|
| (41) | omuhfínj' á-bazire | 'the farmer who counted' |
| | omuhfínj' á-bónire | 'the farmer who found' |
| | omukám' á-baziire | 'the chief who sewed' |
| | omukám' á-káaraanjire | 'the chief who dry roasted' |

These phrases are tonally similar to those in (40). Again, HDEL does not apply.

3.3.5 Prepositional/Possessive Phrases

HDEL also fails to occur when there is a following prepositional phrase within the phrase in question. This fact turns out to be highly relevant later in this analysis as we shall see that an NP comprising two conjoined NPs behaves differently.

Some examples of prepositional phrases within the noun phrase illustrate the persistence of the high tone on the head noun.

- | | | |
|------|-----------------------|-------------------------|
| (42) | a. enkóko y'ómuhfínji | 'chicken of the farmer' |
| | embwáá y'ómwáana | 'dog of the child' |
| | embúzi y'ómuhfínji | 'goat of the farmer' |
| | ecitaandá c'ómwáana | 'bed of the child' |

- | | |
|----------------------|---------------------------------|
| b. embúzi y'ómurimi | 'goat of the farmer' |
| mareéré y'ómurimi | 'hawk of the farmer' |
| embíbo zá kaarweenda | 'seeds of a karweenda' |
| ecikópo cáá kaarweza | 'cup of karweza (a thin sauce)' |

The head of the whole NP in (42) is high toned. Observe that in all the cases this high tone is retained. The difference between (42a) and (42b) is the presence of a high tone on the stem of the lower noun. In (42a), the lower noun is high toned while in (42b) it is toneless. However, this apparently makes no difference in the application of HDEL in this construction. The tonelessness of the noun stems in (42b) is made somewhat irrelevant by the appearance of a high tone on the initial vowel of the noun or on the vowel of the associative preposition.

3.3.6 Multiple Words in the Phrase and HDEL

When a string of adjective, quantifier, and/or possessive words follows the head noun, only the word immediately following the noun is relevant for the application of HDEL. There is a change in emphasis when a quantifier appears first; however, the basic meaning of the phrase remains the same. In (43), the high tone of the noun stem only deletes when the high-toned adjective is the immediately following word.

- | | |
|---------------------------------|--------------------|
| (43) a. abakáma báñji baruunji | 'many good chiefs' |
| abakáma baruunji báñji | 'many good chiefs' |
| b. abakáma báñji bakúru | 'many old chiefs' |
| abakama bakúru báñji | 'many old chiefs' |
| (44) a. abahíñji bóóna baruunji | 'all good farmers' |
| abahíñji baruunji bóóna | 'all good farmers' |
| b. abahíñji bóóna bakúru | 'all old farmers' |
| abahíñji bakúru bóóna | 'all old farmers' |

In (43) and (44), the (a) phrases contain a toneless adjective and a high-toned quantifier while the (b) phrases contain a high-toned adjective and a high-toned quantifier. Note that the high tone of the noun only deletes when a high toned adjective *immediately* follows the noun.

The same relationship holds in the following two sets of data but with a demonstrative instead of a quantifier. Again, note that the high tone of the noun only deletes when the following word is a high-toned adjective.

- | | |
|-------------------------------|-------------------|
| (45) a. omukám' óógu muruunji | 'this good chief' |
| omukáma muruunji' óógu | 'this good chief' |
| b. omukám' óógu mukúru | 'this old chief' |
| omukáma mukúr' óógu | 'this old chief' |

- (46) a. enkók' ééji nuunji 'this good chicken'
 enkóko nuunj' ééji 'this good chicken'
- b. enkók' ééji nkúru 'this old chicken'
 enkókoo nkúr' ééji 'this old chicken'

The same patterns hold true when the demonstrative or quantifier is replaced with a number, as shown in (47)

- (47) a. enkóko mukááгаа nkúru 'six old chickens'
 enkókoo nkúru mukáага
- b. enkóko mushaanzhu nkúru 'seven old chickens'
 enkókoo nkúru mushaanzhu
- c. amakáma mukááгаа baruunji 'six good chiefs'
 abakáma baruunji mukáага
- d. abakáma mushaanzhu baruunji 'seven good chiefs'
 abakáma baruunji mushaanzhu

The high tone on the noun only deletes when the triggering word immediately follows the target. If two adjectives follow the noun, only the first one is relevant for the application of HDEL. Compare the two word order variants given in (48).

- (48) a. abaana bató baruunji 'young good children'
 abáána baruunji báto 'good young children'
- b. embwaa nkúru nuunji 'old good dog'
 embwáá nuunjii nkúru 'good old dog'

The high tone of the head noun only deletes when the high-toned adjective, *bató* 'young' or *nkúru* 'old', immediately follows the head noun.

In comparison to HINS, the principles of HDEL are more restricted. HDEL only considers the immediately following phrase, even if it is only a single word. Furthermore, we shall see that HINS can be blocked by a high tone that is *not* in the immediately following word.

3.3.7 Verbs and HDEL

Verbs are not subject to the application of HDEL. This sets Runyankore apart from some of the other familiar Interlacustrine languages that do have the deletion of high tones on verbs: Zinza (Odden 1997), Runyambo (Hubbard 1992), Kinyambo (Bickmore 1989), for example. The verb forms in (49) illustrate several verb tenses with high tones appearing on the verb despite a following high-toned object.

(49) Failure of HDEL to target verbs

- a. Infinitive
 oku[téécera kakúru 'to cook for Kakuru'
 oku[shéédecereza kakúru 'to escort Kakuru'
- b. Remote Past Tense
 akakwáata kaankomáangwa 's/he caught the woodpecker'
 akahéédecereza kaankomáangwa 's/he destroyed the woodpecker'
- c. Yesterday Past Tense
 aréébire kaankomáangwa 's/he saw the woodpecker'
 akwaasiré kaankomáangwa 's/he caught the woodpecker'
- d. Yesterday Past Tense Negative
 taréébire kankomáangwa 's/he didn't see the woodpecker'
 takwaasiré kaankomáangwa 's/he didn't catch the woodpecker'
- e. Habitual
 arééba kaankomáangwa 's/he sees the woodpecker'
 akwaatá kaankomáangwa 's/he catches the woodpecker'
- f. Perstative
 naacibazíírira káto 's/he is still sewing for Kato'
 naacikaraanjirá káto 's/he is still dry roasting for Kato'

As described above, HDEL applies only to nouns. As these various verbs have illustrated, HDEL does not apply to them.

From the data presented above, we may generalize that HDEL applies to the head of a noun phrase when a high-toned complement immediately follows the noun. Furthermore, that complement can only be either an indefinite adjective (i.e., one lacking an initial vowel) or a possessive pronoun.

3.3.8 Concluding Remarks on HDEL

As the preceding sections have detailed, HDEL has a rather limited range of application. In summary, it only applies when the following word is high toned, and when that word is of a particular lexical/grammatical category. These include adjectives and possessives. Numbers, quantifiers, demonstratives, and phrases all fall *outside* of the domain of HDEL.

In the next section, we will examine the limitations on HINS so that we may compare these two principles later.

3.4 Application of HINS

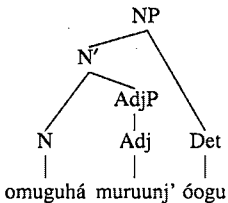
Only the immediately following constituent is crucial for the application of HINS (we shall see below that it is not just a following word that is relevant). If the word following a toneless head noun is toneless, then a high tone appears on the last vowel of the head noun. For example, consider the phrases in (50), where a toneless noun is followed by a toneless modifier and a high-toned word (quantifiers, numbers, or determiner).

- (50)
- | | | |
|----|-------------------------------|-----------------------------|
| a. | omuguhá muruunj' óogu | 'this good rope' |
| | enkaitó nuunj' ééji | 'this good shoe' |
| b. | enkaitó nuunji mukáaga | 'six good shoes' |
| | emiguhá yaanje mukáaga | 'my six ropes' |
| c. | enkaitó zaanje nkúru | 'my old shoes' |
| | enzhú yaanje nkúru | 'my old house' ⁹ |
| d. | emiguhá yaanje yóóna | 'all my ropes' |
| | enkaitó zaanje zóóna | 'all my shoes' |
| e. | emiguhá yaanje mikúru yóóna | 'all my old ropes' |
| | emiguhá yaanje miruunji yóóna | 'all my good ropes' |
| f. | emiguhá miruunji yóonka | 'only good ropes' |
| | abaantú baruunji bóombi | 'both good people' |

In these examples, the toneless nouns have a high tone on their final syllable because the following word is toneless. If any high tone in the entire noun phrase were sufficient to block HINS, we would not expect to find the inserted high tone.

The phrases in (50) would have the following structure, given in (51).

- (51) omuguhá muruunj' óogu 'this good rope'



⁹ Unlike in the nearby language Kikerewe, the word for house in Runyankore, *enzhu*, is toneless underlyingly. Compare it to *énzhu* 'gray hairs', which is underlyingly high toned.

When there are multiple words in the noun phrase, the determination of the tone of the head noun is based upon the phrase that follows. What is interesting is that the order of the words that follow (adjectives, quantifiers, determiners, and possessives) is not entirely fixed, though there do seem to be some restrictions. However, there does seem to be a preference for the order that places the adjective first (i.e., immediately after the head noun). Semantically, the post-head position seems to be the more prominent—the emphasis is more likely to be placed there.

- (52) a. *enkaito mukáágaa nkúru* 'six old shoes'
 enkaitoo nkúru mukáaga
- b. *enkaitó mushaanzhuu nkúru* 'seven old shoes'
 enkaitoo nkúru mushaanzhu
- c. *enkaitó nuunji mukáaga* 'six good shoes'
 enkaito mukáága nuunji
- d. *enkaitó musaanzhu nuunji* 'seven good shoes'
 enkaitó nuunji mushaanzhu

Again, HINS only takes place when the following word is adjectival and toneless. HDEL also only takes place when the head is high toned and the immediately following word is a high-toned adjective.

Interestingly, we might expect any following high-toned adjective or possessive to condition HDEL. However, when these words are not immediately after the head noun, no HDEL occurs. In (53), the high tone of the head noun, the first word in the phrase, is not deleted, despite a high tone that appears later.

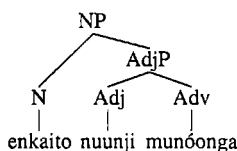
- (53) a. *enzhú zaanje nuunji* 'my good gray hairs'
 enzhú zaanje nkúru 'my old gray hairs'
- b. *omwáána waanje muruunji* 'my good child'
 omwáána waanje mukúru 'my old/important child'
- (54) a. *enkaitó zaanje nuunji* 'my good shoes'
 enkaitó zaanje nkúru 'my old shoes'
- b. *enzhú yaanje nuunji* 'my good house'
 enzhú yaanje nkúru 'my old house'
- c. *enkaito záftu nuunji* 'my good shoes'
 enkaito záftuu nkúru 'my old shoes'

The data in (54) suggest that only the following word is relevant. HINS still takes place when a toneless possessive follows a toneless noun, despite the high-toned adjective later in the phrase: *enkaitó zaanje nkúru* 'my old shoes'. However, we should

consider whether the conditioning factor is a single word, or a phrase. We can test this by adding the word *munóonga* 'very' after the adjective. If HINS still occurs, then the high on *munóonga* would appear not to be relevant. However, if HINS is blocked, then it is not just the following word that is relevant, but the entire phrase. The noun phrases in (55) begin with a toneless noun, followed by an adjective phrase containing a toneless adjective and the word *munóonga* 'very'. There is no HINS in (55).

- (55)
- | | |
|---------------------------|-------------------|
| enkaito nuunji munóonga | 'very good shoes' |
| omuguha muruunji munóonga | 'very good rope' |
| omuhoro muruunji munóonga | 'very good panga' |
| eipapa riruunji munóonga | 'very good wing' |

- (56) 'very good shoes'



From the data in (55), we can conclude that HDEL is blocked when there is a high tone in the following phrase, even if it is not adjacent to the target. The high tone on *munóonga* 'very' is within the AdjP that follows the noun, as illustrated in (55). Recall from the data just examined in (54) that a high tone later in the phrase does *not* block HINS.

We also see the same limitation placed on HDEL. In all cases in (57) with the configuration high–low–high, the high on the head noun persists despite the later high tone on an adjective. This high tone would otherwise condition HDEL.

- (57)
- | | | |
|----|--------------------------|------------------|
| a. | embwáá nuunji zóonka | 'only good dogs' |
| | ebikópo biruunji byóombi | 'both good cups' |
| b. | embwáá zóómbi nuunji | 'both good dogs' |
| | embwáá zóómbii nkúru | 'both old dogs' |

3.4.1 Extensions to the principle of HINS

As promised above, the following sections detail the fact that HINS looks not just at the following word in the higher phrase, but at the phrase following the target HINS. First, we examine the types of phrases that may follow a noun head and the tonal facts that are relevant to them.

In order to explain fully the limitations of HINS, we have to have a good understanding of the syntax. I assume for the purposes of argument an X-Bar syntactic

- (59) L of L
- | | |
|---------------------|--------------------------|
| omuguha gwáá buremu | 'rope of Buremu' |
| ecijere cáá buremu | 'foot of Buremu' |
| enda yá kapa | 'stomach of the cat' |
| enkoni yá karweenda | 'cane of cypress (wood)' |
| eihuri yá buremu | 'Buremu's egg' |
| ebijere byáá buremu | 'Buremu's feet' |

When the possessed and possessor nouns are both toneless, a high tone appears on the associative preposition. It is necessary to use words that are consonant-initial to see the high tone on the preposition.

- (60) H of L
- | | |
|---------------------|-----------------------------|
| ecikópo cáá buremu | 'cup of Buremu' |
| omukóno gwáá buremu | 'arm of Buremu' |
| entééka yá buremu | 'cooking (style) of Buremu' |
| erííno ryáá buremu | 'Buremu's tooth' |
| ecicére cáá buremu | 'Buremu's frog' |
| amaarwáá gá buremu | 'Buremu's beer' |

The phrases in (60) show that the tone of the possessed noun does not affect the appearance of a high tone on the preposition when the possessor (the lower NP) is toneless. Contrast the tone of the preposition when the possessor noun is toneless, (59)–(60), with cases where the possessor noun is high-toned, (61)–(62), which follow.

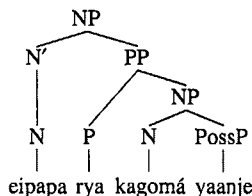
- (61) L of H
- | | |
|---------------------|----------------------------|
| omuguha gwaa kakúru | 'rope of Kakuru' |
| omuguha gwa kakúru | 'rope of Kakuru' |
| ecijere caa kakúru | 'foot of Kakuru' |
| eipapa ryaa maréere | 'wing of a bataleur eagle' |
| eihuri ya kakúru | 'Kakuru's egg' |
| ebijere byaa kakúru | 'Kakuru's feet' |
- (62) H of H
- | | |
|---------------------|------------------|
| omukóno gwaa kakúru | 'arm of Kakuru' |
| ecikópo caa kakúru | 'cup of Kakuru' |
| erííno ryaa kakúru | 'Kakuru's tooth' |
| ecicére caa kakúru | 'Kakuru's frog' |
| amaarwáá ga kakúru | 'Kakuru's beer' |

The phrases in (61) and (62) show the *failure* of HINS on the preposition when the following word is high-toned. The tone of the possessor is irrelevant—the tonal quality of the preposition does not change when the possessed noun changes.

However, if there is a high tone anywhere lower in the phrase, then no high appears on the possessive preposition. A high tone in the phrase following the prepo-

sition will block HINS on the preposition. One such structure involves a possessive pronoun following the possessor noun. Syntactically, this would appear as in (63).

- (63) "wing of my eagle"



This observation is further confirmed by the phrases in (64).

- (64) a. eipapa rya kagomá yaanje 'wing of my eagle'
 eipapa rya kagomá nuunji 'wing of a good eagle'
 amapapa ga kagomá mushaaanzhu 'wings of seven eagles'
- b. eipapa rya kagoma nkúru 'wing of an old eagle'
 eipapa rya kagoma yaifu 'wing of our eagle'
 amapapa ga kagoma mukáaga 'wing of six eagles'

In all of these phrases, there is a high tone somewhere after the preposition. In (64a), a high appears because of HINS. In (64b), the high tone that blocks HINS appears lexically on a word that follows the possessor noun: *nkúru*, 'old', *yaifu* 'our', or *mukáaga* 'six'. The phrases in (65) illustrate what happens if a high tone appears somewhere in the embedded NP. When the NP within the PossP is toneless, a high tone appears on the preposition: *eipapa ryá kagoma* 'wing of a bataille eagle'. However, if there is a high tone within the embedded NP, HINS cannot target the preposition. Also, this inserted high tone, or any other high tone within the PossP will block HINS onto the head noun, as shown in (65).

- (65) a. eipapa ryá kagoma 'wing of a bataille eagle'
 eipapa rya kagomá nuunji 'wing of a good b. eagle'
 eipapa rya kagomaa mpáango 'wing of a big b. eagle'
 eipapa rya kagomaa nkúru 'wing of an old b. eagle'
 eipapa rya kagomá yaanje 'wings of my b. eagle'
 eipapa rya kagoma yaifu 'wings of our b. eagle'
- b. amapapa ga kagoma mukáaga 'wings of six b. eagles'
 amapapa ga kagomá mushaaanzhu 'wings of seven b. eagles'
- c. eipapa rya mareére 'wing of a hawk'
 eipapa rya mareeree mpáango 'wing of a big hawk'

- d. ecaashuri cáá kagoma 'nest of a b. eagle'
 ecaashuri caa kagomá nuunji 'nest of a good b. eagle'
 ecaashuri caa kagomaa mpáango 'nest of a big b. eagle'

The examples in (65) illustrate the *failure* of HINS before a possessive phrase. A high tone anywhere in the PossP will be sufficient to prevent HINS on the head noun of the entire NP, in this case *eipapa* 'wing' or *amapapa* 'wings'.

Before taking up a fuller analysis of both HDEL and HINS we need to examine in more detail the tonal properties of a noun and noun phrase within another phrase. As we will see in the next section, principles related to phrasal tone have a broader application than between two adjacent words. In the next section, we examine the tonal properties of the initial vowel and morphemes that appear to occupy a similar syntactic position.

HINS will also target the NP that precedes the PP if there is a toneless adjective in it. In the phrases in (65), HINS targets the highest noun if there is a toneless adjective or possessive pronoun after it. The presence of a high tone in the PossP does not block HINS in this case.

- (66) ei-papá ri-ruunji ryáá kagoma
 CL5.wing CL5.good CL5.of eagle
 'good wing of the eagle'
 enkaitó nuunji y'ómuuntu mukúru
 'good shoe of the old person'
 amapapá gaanje ga maréere
 'my wings of a hawk'
 eñamá yaanje y'émpuno
 'my meat of the pig'

The introduction of the adjective or possessive seems to allow for the possibility of HINS targeting both the head noun and the preposition (as in the first example).

4.2 Quantifier Heads

In most noun phrases, the first element is the noun itself, as we have seen above. However, several kinds of words can precede the head noun of an NP. They occupy the position normally taken by the initial vowel. These words seem to include, but not limited to: *buri* 'each/every'; *ibára* 'any'; *-ndí* 'other'; *-ndíizho* 'other' (different) and some demonstratives.¹⁰ The word *ibára* 'each (type of)' is related to the word

¹⁰ Interestingly, the word *kana* 'owner of' does not seem to be within my informant's command. In fact, it does not appear in Taylor's dictionary of Runyankore-Rukiga either. It is found in the nearby, related language Kikerewe.

eibára 'type, kind' as in a particular variety of something: *eibára ry-éente* 'type of cow', *eibára ry-óómurimi* 'type of farmer'. When the noun is preceded by one of these words, it loses its initial vowel. Some various example of this are given in (67).

- | | | |
|------|---------------------|------------------------|
| (67) | <i>burí</i> mu-rimi | 'every farmer' |
| | every CL1.farmer | |
| | <i>ibára</i> murimi | 'each farmer' |
| | owúúndi murimi | 'another farmer' |
| | ondíízhó murimi | 'another (new) farmer' |

Of particular interest in this discussion of tone is the word *buri* 'every'. All other pre-nominal modifiers have a lexical high tone. When the following noun is toneless, the word *buri* appears with a high tone. However, if the following word is high toned, then *buri* appears as toneless. Both types of noun appear in (68).

- | | | |
|------|---------------------------------|----------------------|
| (68) | a. <u>Toneless Nouns</u> | |
| | <i>burí</i> murimi | 'every farmer' |
| | <i>burí</i> muguha | 'every rope' |
| | <i>buríí</i> nkaito | 'every shoe' |
| | <i>burí</i> ípapa ¹¹ | 'every wing' |
| | b. <u>High Nouns</u> | |
| | <i>buri</i> mwáana | 'every child' |
| | <i>buri</i> músyo | 'every knife' |
| | <i>buri</i> ibáare | 'every stone' |
| | <i>buri</i> kabaráára | 'every banana (sp.)' |

There is a high tone on *buri* 'every' only if the following word is toneless. This also holds true of the following phrase. In other words, just as we saw with noun heads of phrases, we also find the HINS is blocked when the phrase following the word *buri* 'every', contains a high tone.

- | | | |
|------|--------------------------------------|------------------------------|
| (69) | <i>buri</i> mwáana mukúru | 'every old/important child' |
| | <i>buri</i> muhíinji mukúru | 'every old/important farmer' |
| | <i>buri</i> murumi mukúru | 'every old/important farmer' |
| | <i>buri</i> muguha mukúru | 'every old rope' |
| | <i>burií</i> nkaitoo nkúru | 'every old shoe' |
| | <i>buri</i> murimi muruunji munóonga | 'every very good farmer' |

As the phrases in (69) illustrate, there is no HINS on *buri* when there is a high tone either on some following adjective, as in (69). In particular, the high tone that appears on the noun in (69c) is a product of phrasal high tone insertion.

¹¹ The high inserted on the *i* of the word *buri* appears on both morae of the long vowel *ii* because falling tones may appear only in phrase-penultimate position.

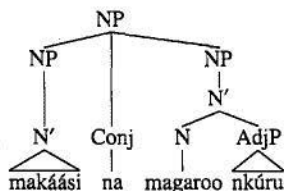
4.3 Prepositions and Conjunctions

The word *na* 'and/with' functions both as a preposition and as a conjunction. It can be a site of HINS, as long as the following phrase is toneless.

- (72) a. ná buremu 'with Buremu'
 ná magaro 'with pliers'
- b. makáási ná magaro 'scissors and pliers'
 kakúru ná buremu 'Kakuru and Buremu'
- cf. c. na kakúru 'with Kakuru'
 na káawa 'with coffee'
 magaro na mkáási 'pliers and scissors'

The phrases in (72a) *na* functions as the preposition 'with'. As long as the following complement to the preposition is toneless, a high tone appears on *na*. In (72b), *na* functions as a conjunction, joining the two NPs. Again, it is a site for HINS if the NP that follows it is toneless. In (73), we see some examples of the blocking of HINS by a high tone somewhere in the following phrase. In the first example, the high-toned adjective *nkúru* 'old' blocks HINS. In the second example, the high tone inserted onto the noun *magaro* 'pliers' is responsible for blocking.

- (73) makáási na magaroo nkúru 'scissors and old pliers'
 makáási na magaró mushaanzhu 'scissors and seven pliers'
- (74) makáási na magaroo nkúru 'scissors and old pliers'



However, prepositions and conjunctions do not have entirely the same behavior with respect to HINS. Significant to later analysis, we find that they have different blocking effects when they are located within an NP that is scanned for HINS blocking of a higher word—when they are within an NP complement to a verb. Consider the two sets of data in (75).

- (75) a. a-ka[reebá kaarweenda ná kaartuusi
 3s.REM[see cypress and eucalyptus
 'S/he saw a cypress and a eucalyptus.'

- | | |
|------------------------------|------------------------------------|
| akagaambirá buremu na kakúru | 'S/he told Buremu and Kakuru.' |
| akareebá kagoma na mareére | 'S/he saw an eagle and a hawk.' |
| akareebá magaro n'ómuguha | 'S/he saw the pliers and rope.' |
| akagurá magaro na makáasi | 'S/he bought pliers and scissors.' |
- b.
- | | |
|--|-------------------------------------|
| akareeba mareeré ná kagoma | 'S/he saw a hawk and an eagle.' |
| akaguza makáasi ná magaro | 'S/he saw the scissors and pliers.' |
| akareeba kaankomáángwa ná kagoma | |
| 'S/he saw the woodpecker and the eagle.' | |

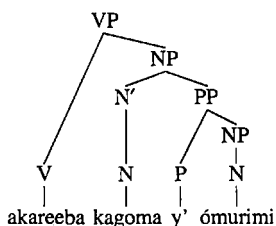
In (75a), HINS targets the verb, *akareeba* 's/he saw', despite the later high tone. Blocking of HINS by a following coordinated NP structure is only accomplished when the high tone is in the immediately following constituent, as in (75b). Contrast these facts with the sentences in (76).

- | | | |
|------|-----------------------------|-------------------------------------|
| (76) | akareeba kagoma y'ómurimi | 'S/he saw the eagle of the farmer.' |
| | akareeba kagoma y'ómwána | 'S/he saw the eagle of the child.' |
| | akareeba magaro zá buremu | 'S/he saw the pliers of Buremu' |
| | akareeba bukaando zá buremu | 'S/he saw the pants of Buremu' |

Here, there is no HINS despite the fact that the word following the verb is toneless, *kagoma* 'bataleur eagle'. The high tone found within the prepositional phrase *is* responsible for the lack of HINS.

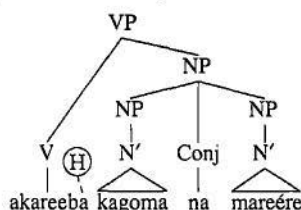
The different structures that these two NP complements have would appear to be relevant. Consider first the NP with an embedded PP, in (77).

- (77) 'S/he saw the eagle of the farmer.'



Here, no high tone appears on the verb because of the high tone on the noun [...ómurimi] 'farmer'. Now, consider the phrase where the complement to the VP contains a conjoined NP, in (78).

- (78) 'S/he saw the eagle and the hawk.'



Here, a high tone is inserted on the final vowel of the verb. In essence, the high tone that is located within the second NP, 'hawk' *mareére*, is not visible to whatever principles are responsible for HINS. This fact will be significant in the discussion of theories accounting for these tone insertion and deletion.

HINS can also take place on other words apart from verbs, as the examples in (79) illustrate.

- (79) a. *enzhu yá buremu na kakúru* 'the house of Buremu and Kakuru'
eipapa ryaa kagoma y'ómurimi 'wing of the b. eagle of the farmer'
eibabi ryaa kaartuusi yá buremu 'leaf of the eucalyptus of Buremu'
- b. *buri cijere n'éénkaito* 'every foot and shoe(s)'
buri muguha na makáasi 'every rope and (a) scissors'
buri kagoma na mareére 'every bataille eagle and a hawk'

In (79a), HINS is blocked before an NP containing a PP with a high tone—HINS cannot target the first word of the NP. In (79b), HINS *can* target the first word of the phrase (*buri*) before a conjoined NP as long as the first part of the conjoined NP is toneless. If the order of elements is reversed, HINS is blocked, as shown in (80).

- (80) a. *buri makáasi ná magaro* 'every scissors and pliers'
buri mareére ná kagoma 'every hawk and bataille eagle'

HINS cannot target the head of the phrase (*buri*) because the first part of the conjoined NP is high toned. Notice also that HINS does target the conjunction *na* because it stands before a toneless noun (*magaro* or *kagoma*).

Just as we saw blocking of HINS before an NP containing a high-toned prepositional phrase (in (76)), we can also expect the failure of HINS on *buri* when its complement NP contains a high-toned prepositional phrase.

- (81) *buri muguha gwáá buremu* 'every rope of Buremu'
buri ciibo caa kakúru 'every basket of Kakuru'
buri nzhu yá buremu 'every house of Buremu'

As noted above, these two types of NP have different structures. In both of the models examined in this discussion, there is some reference to syntactic structure. In the following sections we consider how this and other facts can be dealt with by various theories explaining the interaction between phonology and syntax.

4.4 Verbs

The verb is also a possible site for HINS. There appears to be a greater degree of sensitivity to specific morphological information with respect to a verb. However, the general principle is that a toneless verb followed by a toneless argument will have a high tone on its final syllable.

The verbs in (82) are in the distant past tense. When the following object of the verb is toneless, a high is inserted onto the final vowel of the verb.

- | | | | |
|------|----|--------------------------|---------------------------------------|
| (82) | a. | akareeba kaankomáángwa | 's/he saw the woodpecker' |
| | | akareebá kanyaanaanga | 's/he saw the potato caterpillar' |
| | b. | akaramusya kaankomáángwa | 's/he greeted the woodpecker' |
| | | akaramusyá kanyaanaanga | 's/he greeted the potato caterpillar' |
| | c. | akabaziira buranjíti | 's/he sewed the blanket' |
| | | akabaziirá bukaando | 's/he sewed the trousers' |

Compare the verbs in (82) with those given in (83).

- | | | | |
|------|----|-------------------------------|---|
| (83) | a. | akakwááta kaankomáángwa | 's/he caught the woodpecker' |
| | | akakwááta kanyaanaanga | 's/he caught the potato caterpillar' |
| | b. | akahééndecereza kaankomáángwa | 's/he destroyed the woodpecker' |
| | | akahééndecereza kanyaanaanga | 's/he destroyed the potato caterpillar' |

The verbs in (83) are high-toned. This high tone blocks the application of HINS. Notice also that the adjacency of the tone bearing units is not necessary to block HINS: there is none on the verb *akahééndecereza* 's/he destroyed'. Further examples of verb tenses that permit HINS are given in (84).

- | | | | |
|------|----|---------------------------|---|
| (84) | a. | Recent Past | |
| | | yáá[reebá kanyaanaanga | 's/he has seen the potato caterpillar' |
| | | yáá[reeba kaankomáángwa | 's/he has seen the woodpecker' |
| | b. | Immediate Past | |
| | | yáá[kareebá kanyaanaanga | 'he has just seen the potato caterpillar' |
| | | yáá[kareeba kaankomáángwa | 'he has just seen the woodpecker' |

- c. Immediate Past Relatives
 ayáá[reebá kanyaanaanga 'one who has just seen the caterpillar'
 ayáá[reeba kaankomáangwa 'one who has just seen the woodpecker'
- d. Negative Hodiernal Past
 tibáka[reebiré buremu 'they had not seen Buremu'
 tibáka[tééceire buremu 'they had not cooked for Buremu'
- e. Present Progressive Negative
 táku[baziirirá buremu 'he is not sewing for Buremu'
 táku[káaraanjira buremu 'he is not dry roasting for Buremu'
- f. Habitual Relative
 areebiré karoma 'one who sees the bataleur eagle'
 areebire mareére 'one who sees the hawk'

Only the verb stem is relevant for determining whether or not HINS should occur. High tones in the inflectional portion of the verb (see Poletto, in progress, for more information) do not block HINS. Notice, however, that if the verb root is high toned, as in *véek* 'cook' or *vkáaraang* 'dry roast' found in (84d-e), then HINS is blocked.

Not all verbs are possible targets for HINS, the verb tenses in (84) do not have high tones that are required by the tense/aspect morphology (see Poletto, in progress, for more information). However, there is a set of verb tenses where there a high tone is always inserted onto the stem. For example, the yesterday past tense appears with a high tone somewhere on the verb stem regardless of the input tone of the root. In these cases, there is no HINS. In (85) and (86), the toneless verb root *vreeb* 'see' appears in the affirmative and negative forms of the yesterday past tense. The high tone that appears on the stem is part of the verb morphology. Its presence is sufficient to block HINS regardless of the tonal qualities of the following word. Compare the pairs of sentences given in (85) and (86). The object in the first sentence of each pair is toneless.

- (85) Yesterday Past Tense Affirmative
 a[réébire kanyaanaanga 's/he saw the potato caterpillar'
 a[réébire kaankomáangwa 's/he saw the woodpecker'
- (86) Yesterday Past Tense Negative
 ta[réébire kanyaanaanga 's/he didn't see the potato caterpillar'
 ta[réébire kankomáangwa 's/he didn't see the wood pecker'

Note that there is no HINS when there is a high tone on the verb stem. In these cases, the input verb root is *vreeb* 'see', which is underlyingly toneless. However, the morphologically inserted high tone is sufficient to block HINS.

4.5 Summary of HDEL and HINS

The preceding sections outline the appearance of HINS and HDEL. However, we have not attempted to provide a formal account. At this point, however, it should be clear that HINS has a larger set of possible targets and has a wider range of triggering configurations. On the other hand, HDEL only targets nouns when they are immediately followed by a high-toned possessive pronoun or indefinite adjective. In the following sections, we compare the different theories presented at the outset and show that HINS and HDEL cannot be accounted for under one unified theory that refers only to syntactic or to prosodic structure. In fact, both levels of grammatical representation must be called upon in order to explain these two processes.

5 Accounting for HDEL and HINS

Now that we have considered a wide range of the possible instances where HDEL and HINS can take place, let us continue with a discussion of accounting for and predicting these phenomena. What should be apparent from the preceding discussion is that HDEL has a much more restricted range of application: it only applies to nouns followed by a high-toned adjective or possessive. Verbs are not subject to HDEL (unless they are infinitives, which are both nouns and verbs). On the other hand, HINS has a very broad range of application, targeting nouns, verbs, and prepositions.

As discussed earlier, there are two major theories that can be used to account for these phenomena. The direct reference theory, following Kaisse 1985, Odden 1990, 1996, accounts for these principles in terms of relationships that are directly related to the syntactic structure of the word. An alternative account makes use of Selkirk's (1985) theory of derived domains. Specifically, the interaction between phonology and syntactic structure is mediated by the creation of prosodic domains that are based on syntactic structure. More precisely, these prosodic domains, primarily the phonological phrase (PPh), are defined in terms of edges.

We shall compare these two models for Runyankore and for both HINS and HDEL. What is particularly interesting here is the fact that we have two principles with similar, but not identical, domains of application. Does either theory provide a better account of both of these? Ultimately, we shall find that the range of operation of the principles is in fact quite different. Because of the relatively narrow scope of HDEL we shall see that direct reference to syntactic information is the most perspicacious means to account for the phenomenon. On the other hand, HINS has a very wide range of application. Not only in terms of the lexical categories of the possible targets, but also in the sense that HINS applies between the last two words of a phonological phrase. Following Selkirk, this phonological phrase will be defined in terms of the right edge of a maximal projection.

5.1 Direct Reference Theory

The direct-reference theory (referring to Max-command) appears to account for these facts because of the importance of *heads* of phrases in locating the site for HINS and the target of HDEL.

5.1.1 HDEL

How might Kaisse's direct reference theory account for HDEL? Recall that HDEL only takes place when a high-toned noun is immediately followed by an indefinite adjective or possessive within the same phrase. Is there a syntactic relationship that can pick out this type of complement to a noun but ignore those that do not condition HDEL, such as quantifiers, numbers, demonstratives, phrases, etc.?

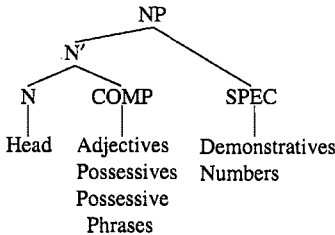
It has been suggested by Hyman & Byarushengo (1984) for Haya, Hubbard (1992) for Runyambo, and Odden for Kimatuumbi (1996) and Zinza (1997) that the sister to the phrasal head within the X' phrase is relevant for certain sandhi effects. In Haya, which is closely related to Runyankore, a high tone is deleted in the following contexts: before a high-toned possessive, before a possessive phrase, and before a high-toned adjective. These are exemplified in (87)

(87) Haya High Tone Deletion (=Hyman & Byarushengo, 1984, p. 73)

- | | |
|--------------------|-------------------------|
| a. ekikómbe | 'cup' |
| ekikombe kyáitu | 'our cup' |
| ekikombe kyaa káto | 'Kato's cup' |
| ekikombe kilúngi | 'a beautiful cup' |
| b. ekikómbe kyange | 'my cup' |
| ekikómbe kyaawe | 'your (sg.) cup' |
| ekikómbe kili | 'that cup (over there)' |
| ekiómbe kimo | 'one cup' |

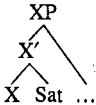
As these various phrases involving the word 'cup', *ekikómbe*, illustrate, high tone deletion in Haya involves a similar environment. Hyman & Byarushengo note that demonstratives and numerals generally occur later in the noun phrase, after adjectives and possessives. They hypothesize that adjectives and possessives are in a "tighter" relationship with the noun (the target of high deletion). Their proposal, then, is that these words stand as sisters to the N under the N' node, while demonstratives, numbers and the like are outside of N' and are expansions of the SPEC node.

(88) NP Structure in Haya



In Runyambo, a very similar process of high tone deletion takes place on noun and verb heads of phrases when a high-toned complement follows them. This process, dubbed high tone reduction (HTR) by Hubbard, targets both noun and verb heads of phrases. Hubbard proposes that both of these phrasal types map to a structure like (89).

(89) Hubbard's Satellite Slot



Apart from nomenclature, this structure is the same as that proposed for Haya in (88). However, Hubbard claims that the "Sat" or satellite slot is privileged in the language and is only generated in certain category-specific instances. Thus, in Runyambo, the satellite position only receives an argument (is generated) in the genitive construction.

For Zinza, Odden notes that a similar principle involving high tone deletion on verbs only takes place if the immediately following high-toned word is a complement of the verb. However, high deletion will not be triggered by a post-posed, coindexed object, as shown in (90), from Odden 1997.

- | | | |
|------|--------------------|----------------------|
| (90) | ateekííle | 'he cooked for' |
| | ateekiile káto | 'he cooked for Kato' |
| | amu,teekíílé káto, | 'he cooked for Kato' |

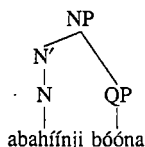
Additionally, high deletion in Zinza cannot be triggered by a post-posed object, as shown in (91).

- | | | |
|------|-------------------------------|---------------|
| (91) | bulemo, y _i -áagwa | 'Bulemu fell' |
| | y _i -áagwa bulemu, | 'Bulemu fell' |

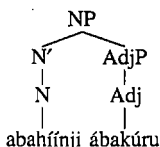
The nodes corresponding to the COMP and the SPEC nodes are labeled in the tree.

In this phrase, the adjective appears as a sister to the N, under N'. In Runyankore, only indefinite adjectives (i.e., those lacking the initial vowel prefix) and possessives can occupy this slot. So, if a phrase has only a quantifier, a number, or some other non-HDEL inducing phrasal element after the noun, then it must appear in a phrase that is sister to N', as in (95).

- (95) 'all the farmers'



- 'the good farmers'



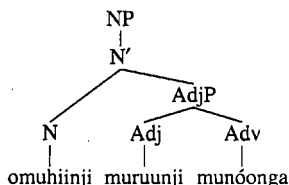
Under direct reference theory, we can isolate this position by allowing for another type of command relationship. As suggested by Odden 1997, this is one based on the single-bar node: X'-command:

- (96) X'-command (Odden 1997)

α X-commands β iff the first X' node which dominates α also dominates β .

In Runyankore, HINS is restricted to occur only when a noun X'-commands a high-toned element. Recall that an adjective phrase can condition HDEL *omuhĩĩnji muruunji munóonga* 'a very good farmer'. In this case, the sister to the N under N' contains a high tone. This structure is given in (97).

- (97) 'very good farmer'



The noun *omuhĩĩnji* 'farmer' X'-commands everything in the AdjP. Because there is a high tone in that AdjP, on the word *munóonga* 'very', HDEL targets the noun. This type of example is particularly interesting because it shows evidence for a long-distance triggering of a phonological effect. The target, *omuhĩĩnji* 'farmer', and the trigger, *munóonga* 'very' are not adjacent words. The word that separates them, *muruunji* 'good', is toneless and thus cannot be the trigger for HDEL on the noun.

One may recall that we saw instances above where the order of the elements in the noun phrase did not follow strictly the order described in (88). I propose that

the language allows for the possibility of some reordering of the elements in the phrase. This is discussed in the following section.

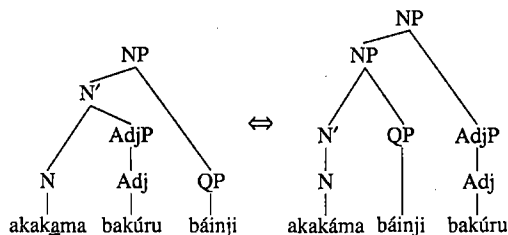
5.1.2 Phrasal Reorganization and Tone Deletion

Recall that the order of the adjective and the quantifier/demonstrative apparently is subject to some variation. A representative sample from (43) is repeated here as (98).

- (98) a. *abakáma báínji baruunji* 'many good chiefs'
 abakáma baruunji báínji 'many good chiefs'
- b. *abakáma báínji bakúru* 'many old chiefs'
 abakáma bakúru báínji 'many old chiefs'

Note that HDEL only targets the noun when the high-toned adjective immediately follows it, as in (98d). The reason that HDEL does not occur in (98c) is because the high toned adjective is no longer in the same syntactic relationship with the noun *abakáma* 'chiefs'.

(99) NP Reorganization



The claim made by (99) is that there is a systematic relationship between these two sentences. In the version on the right, the AdjP *bakúru* 'old' occupies the SPEC position of a higher NP. The relationship in the second tree is one of adjunction. Whether this is accomplished by a transformation (i.e., by movement) or simply by a parallel type of derivation is not crucial to this analysis.

The significant point, however, is that the adjective phrase in this example no longer stands in the same syntactic relationship with the head noun *abakáma* 'chief'. Because of this, we theorize, HDEL cannot target the head of the phrase.

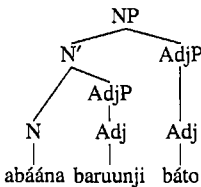
5.1.3 Multiple Adjective Phrases

There may be multiple adjectives or a combination of adjectives and possessives after a noun. Which of these are relevant for the application of HDEL? First, consider the following.

- (100)
- | | | |
|----|-----------------------------|-----------------------|
| a. | abáána baruunji baáto | 'good young children' |
| | abaána bató baruunji | 'young good children' |
| b. | embwáá nuunjii nkúru | 'good old dog' |
| | embwaa nkúru nuunji | 'old good dog' |
| c. | embwáá yaanje nuunjii nkúru | 'my good old dog' |
| | embwaa yáftu nuunjii nkúru | 'our good old dog' |

The phrases in (100) illustrate the fact that HDEL only considers the immediately following adjective. If a high-toned adjective is separated from the noun by a toneless adjective, HDEL does not occur. For these phrases, I propose that the structure of the noun phrase is the determining factor in the deletion of the high tone. This structure is given in (101).

- (101) 'young good children'



In the phrase *abáána baruunji báto* 'good young children', HDEL would target the noun *abáána* 'children'. However, because it does not X'-command a high-toned complement HDEL does not occur. The high-toned adjective *báto* 'young' has no effect on the noun because it is above the N' node and is not X'-commanded by the noun. Rather, it occupies the SPEC node under the NP.

5.2 Contrasting the Domains of HDEL and HINS

Before continuing with this analysis, let us take a moment to compare the differences between HDEL and HINS. One of the important differences between these two is the difference in the domains of their application.

5.3 HINS, Phrasal Constituency and Domain Construction

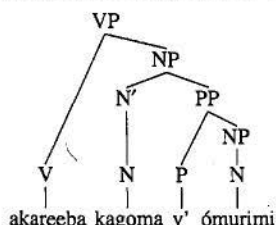
Under the prosodic domain approach to the syntax-phonology interface (Selkirk 1986, discussed in section 2.2.1 above), the application of a phonological rule is restricted within a particular prosodic domain. This domain is constructed based upon the ends of a specified syntactic category (usually XMax).

In the case of Runyankore, HDEL and HINS, as seen above, have different domains of application. We have just examined HDEL and have seen that we can refer to its characteristics by referring to the X'-command relationship that holds between the

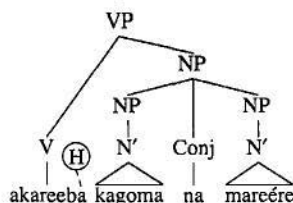
target and the triggering phrase. We will continue to assume that HDEL only considers what is within the X' category, while HINS has a wider domain of application, namely one that extends up to the edge of an XMax category.

The Direct Reference Theory can account for the data pertaining to HDEL. However, as promised above, the contrast between NPs with embedded prepositional phrases and conjoined NPs plays an important role. I repeat examples of these two structures here (from (77) and (78)).

- (102) akareeba kagoma y'ómurimi 'S/he saw the eagle of the farmer.'



- (103) akareebá kagoma na mareére 'S/he saw the eagle and the hawk.'

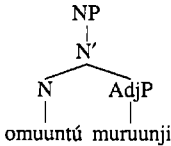


Notice that HINS fails in (102) (presumably because of the high tone on *ómurimi* 'farmer'). However, it *succeeds* in (103), *despite* the high tone on *mareére* 'hawk'. If the requirement is that the verb (the target of HINS) max-command a toneless phrase, then why is HINS not blocked in (103)? Because the high tone blocks HINS, it would appear that we only want to look as far as the first maximal projection. So, with respect to (103), only the NP containing *kagoma* is relevant. However, the Max-command relationship does not permit us to make this kind of distinction. The verb *akareeba* max-commands everything within the following NP, including *mareére*, which has a high tone. This presents a significant problem for an account that would rely solely upon the max-command relationship.

What this issue *does* suggest is that the scansion for high tones only searches as far as the end of the next maximal projection, without regard to embedding. This is exactly the kind of relationship that Selkirk's end-based prosodic theory tackles.

The application of HINS in Runyankore from an edge-based perspective is trivial. In fact, it is able to explain the differences between an NP with an embedded PP and an NP containing two conjoined NPs. First, let us examine a simple case, exemplified in (104).

- (104) 'a good person' (*omuuntu muruunji*)



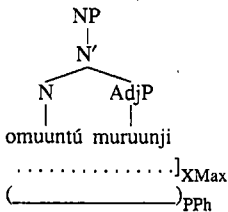
Here, HINS targets the word preceding the word at the end of an XMax phrase (in this case, NP). Following Selkirk, the parameters for the construction of a prosodic domain would be:

- (105) HINS parameters

- | | |
|--|---|
| a.] _{XMax} | Insert a boundary at the right edge of an XMax category. |
| b. PPh | The edge is the edge of a prosodic phrase. |
| c. $\emptyset \rightarrow H / [_ \#]_{\omega} [X]]_{PPh}$
X is toneless | Insert a high tone on the right edge of a toneless word that stands before the last element (X' or X ⁰) of the PPh. |

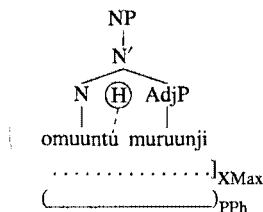
By (105a & b), the following domain would be constructed.

- (106) Domain Mapping onto 'a good person'



Based upon the PPh domain, the principle of HINS in (105) can apply, inserting a high tone onto *omuuntu* 'person'.

- (107) HINS onto 'a good person'

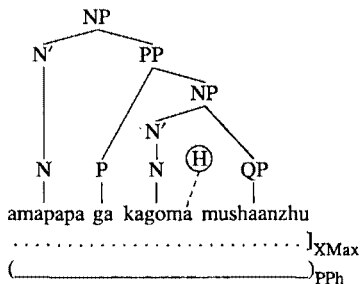


According to the specification of HINS given in (105c), only the word preceding the last element, word or phrase, of the PPh is targeted for HINS. Because of the structure of Runyankore, the successful target will be the word immediately prior to the last word in PPh. A counterexample would involve a toneless phrase appearing after a word that is a target for HINS. However, because of the conditions on HINS, that following toneless phrase should get a high tone (blocking HINS further to the left). Under a direct reference account, this would block any HINS onto a higher head (whether or not it X'-commands the lower unit). Furthermore, there are no examples of toneless phrases failing to undergo HINS. Unfortunately, adjectives take only *munóonga* 'very' as a complement. Because of the high toned *munóonga* HINS cannot target the adjective. Thus, we cannot test to see whether HINS would also target a toneless adjective. Note, however, that the phrases in (108) do not have high tones on the head nouns (*omuguha* 'rope' and *omuhoro* 'panga').

- (108) omuguha muruunji munóonga 'a very good rope'
 omuhoro muruunji munóonga 'a very good panga'

Let us consider a longer example examine the problem of recursive embedded domains. In the phrase in (109), a high tone appears on the last vowel of *kagoma* 'bataleur eagle'.

- (109) amapapa ga kagomá mushaanzhu 'wings of seven bataleur eagles'



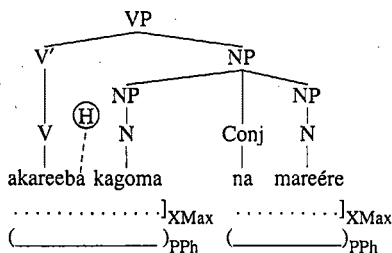
All the words in the input to the phrase in (109) are toneless. Under the direct reference account, we needed to specify that only the innermost head receives the high tone. However, in the prosodic domain account all the higher head of phrases are subsumed within the same prosodic domain. The principles of domain creation in (105) scans until the end of the XMax category. Any earlier sites for HINS are effectively ignored because they are not penultimate in the PPh, as required by the principle of HINS as formalized in (105c).

Another problematic area for the direct reference account, one whose resolution within that theory is not clear, involves the different behaviors of NPs depending upon their internal structure. These two possibilities are exemplified in (110). Recall that HINS will target a word when its NP complement contains a conjoined NP, as long as the first NP within it is toneless; it does not care about the tonal value of the second NP. On the other hand, a high tone within an embedded prepositional phrase will be sufficient to block HINS. See (110a) and (110b), respectively.

- (110) a. akareebá kagoma na mareére 'S/he saw an eagle and a hawk.'
 b. akareeba kagoma y'ómwáana 'S/he saw the eagle of the child.'

We know that these two types of NP have different internal structures. It is the different in the structures that allow the edge computation algorithm in (105) to create different prosodic domains, and thus predict the correct application of HINS.

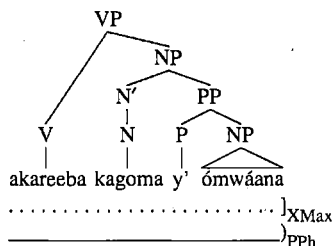
- (111) akareebá kagoma na mareére 'S/he saw an eagle and a hawk.'



In (111), the scansion of the VP reveals an edge at the end of the word *kagoma* 'eagle'. Unlike the direct reference theory, which would include the rest of the parent NP in the XMax domain of the verb *akareeba*, the prosodic phrase ends before the rest of the conjoined construction. In fact, a second prosodic phrase is created based on the next end of XMax. If this final NP had been toneless, we would have also gotten HINS on the conjunction *na* 'and' (see (75) and (80) for several examples of HINS onto this word).

Compare the prosodic structure of (111) with that found in (112).

- (112) akareeba kagoma y'ómwáana 'S/he saw the eagle of the child.'



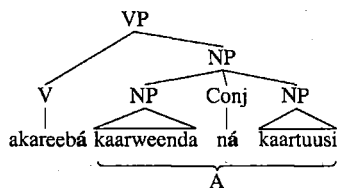
Here, the end of an XMax is not encountered until the very end of the entire VP. Because of this, the entire VP maps to one prosodic phrase. In this case, then, the verb *akareeba* is not a possible target for HINS given the principle in (105c).

Another piece of evidence that the XMax edge is relevant to domains is the fact that HINS can apply twice within a domain that would be a single max-command domain. Consider the following sentence, repeated from (75).

- (113) a-ka-reeb-á kaarweenda ná kaartuusi
 3S-REM-saw-FV cypress and eucalyptus
 'S/he saw a cypress and a eucalyptus.'

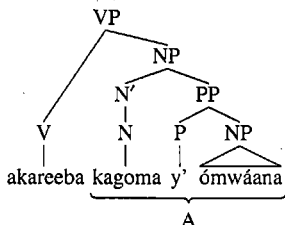
Note that HINS has targeted both the verb *akareeba* 's/he saw' and the conjunction *na* 'and'. If the syntactic relationship required for the application of HINS were max-command, then the verb *akareeba* 's/he saw' would max-command the rest of the sentence and HINS should only apply once. The sentence in (113) has the phrase structure given in (114).

- (114) akarreebá kaarweenda ná kaartuusi 'S/he saw a cypress and a eucalyptus.'



The domain "A" is the range of the max-command relationship of the verb *akarreebá* 's/he saw'. The problem lies in the fact that the exact same max-command relationship holds in a sentence with a prepositional phrase after the verb, such as the sentence in (110b). However, HINS cannot occur in this sentence, repeated here as (115).

- (115) akareeba kagoma y'ómwáana 'S/he saw the eagle of the child.'

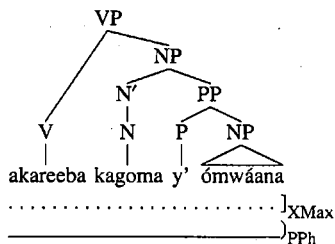


Observe that the max-command domain of the verb *akareeba* 's/he saw', A, is the same in the sentence in (115). However, the tonal output is not the same. The failure of HINS to apply (inserting a high tone on the verb) is attributed to the high tone that is present on the object of the preposition *ómwáana* 'child'. Why does this high tone block HINS while the high tone on the conjunction *na* 'and' in (114) fail to block HINS? If there is a domain for HINS that includes the verb then it must also include the object of the preposition in (115). On the other hand, there must be two separate HINS domains in the sentence where two high toned are inserted, as in (114).

The problem with computing the domains of HINS by referring to the max-command relationship is that it makes the wrong prediction, in the case of a sentence with a conjunction. The conjunction should not present a barrier to the verb max-commanding the two NPs conjoined by the conjunction. We would expect a parallel behavior between a NP containing two conjoined NPs and an NP containing a noun and a prepositional phrase.

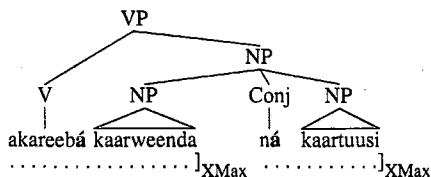
We therefore conclude that the direct-reference account that makes use of the max-command relationship is unable to distinguish between these two structures. On the other hand, the edge-based account is able to distinguish between these two sentences. Notice that the edge of the XMax category in the sentence in (115) comes at the very end of the utterance.

- (116) akareeba kagoma y'ómwáana 'S/he saw the eagle of the child.'



On the other hand, a conjoined NP contains an NP maximal projection within it, and this is apparently where the boundary between the two domains for HINS lies.

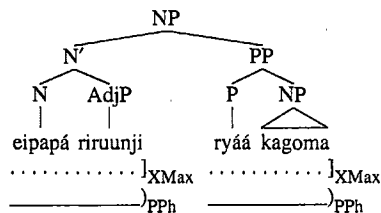
- (117) akareebá kaarweenda ná kaartuusi 'S/he saw a cypress and a eucalyptus.'



In the sentence in (117), the right edges of the XMax define the edges of the domains for HINS, viz. the phonological phrase.

The end-based account also allows us to explain why we find HINS on the head noun when there is an intervening toneless modifier, despite a prepositional phrase with a high tone. Examples of this appear in (66). In (118), repeated from (66), the right edges of the XMax phrases delimit the phonological phrases.

- (118) eipapá riruunji ryáá kagoma 'good wing of the eagle'



With the addition of an adjective phrase, *riruunji* 'good', an additional phonological phrase appears. Because of this, the high tone that appears within the PP is not seen from within the N'.

In this section, we have examined the evidence in favor of the edge-based analysis of high tone insertion. Along the way, we have considered an alternative analysis based upon syntactic relationships. However, as the differences in the data and the application of HINS have shown, the preferred analysis will be the edge-based analysis.

5.4 HDEL and the Phrasal Analysis

What is striking about this analysis the syntax-phonology interface of Runyankore is the proposal that one rule makes reference to syntactic relationships (HDEL) and that

another (HINS) depends upon the edges of a prosodic category, the phonological phrase, which is constructed based upon the right edge of a maximal projection.

As we have just seen, the principle of phrasal HINS cannot be as neatly accounted for under the rubric of direct reference. But, on the other side of the theoretical coin, can HDEL be accounted for by means of a prosodic domain?

The first problematic issue with this approach would be determining what, in fact, the prosodic domain for HDEL is. Leaving aside the possibility that it also is the phonological phrase, we would have to consider a prosodic unit lower in the hierarchy (as the domain for HDEL lies within the domain for HINS). Could we refer to the clitic group or the phonological word? The most compelling counter-evidence to such a claim is the fact that an adjective phrase comprising a toneless adjective and the high-toned adverb *munóonga* 'very, a lot' can trigger HDEL (recall the examples given in (55): *qmuhiĩnji muruunji munóonga* 'a very good farmer'). There does not seem to be any good evidence that these three words constitute a phonological word.

6 Conclusion

One of the significant debates in the study of the interface between syntax and phonology involves the type of information that is accessible to the phonology of a language from the syntactic structure. The primary question seems to be "can phonological rules make reference to syntactic structure?" Or, is the phonology limited to information that is mediated through levels of prosodic structure created from (restricted) syntactic information.

In Runyankore, the application of the two main phonological principles that must have access to syntactic information suggests that both types of rules may in fact be necessary. Consider that the principle of HDEL has such a limited range of application. Because it only applies to nouns when a particular type of complement follows, the principle that directs its application should have access to this type of specific syntactic information. On the other hand, the principle governing HINS appears to be quite broad, targeting any toneless word that comes before another toneless word at the end of some expanse. Recall the facts of coordinated expressions, which are one unit syntactically, but have a break in before the conjunction. These facts support the notion that the *end* of some syntactic domain is relevant. Furthermore, the more general application of HINS at least allows for the possibility that a more general category (in this case, the phonological phrase) defines the domain of application for these rules.

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